



10/661844

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PATENT
135486

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent No.: 6,968,042

Issued: November 22, 2005

Inventor(s): Toth et al.

Assignee: GE Medical Systems Global
Technology Company, LLC

For: METHODS AND APPARATUS FOR
TARGET ANGLE HEEL EFFECT
COMPENSATION

Certificate
OCT 22 2007
of Correction

CERTIFICATE OF MAILING

I certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Attention Certificate of Corrections Branch, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on October 12, 2007.


Eric T. Krishke
Reg. No. 42,769

Attention Certificate of Corrections Branch
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR CERTIFICATE OF CORRECTION OF
PATENT UNDER 37 C.F.R. 1.322(a)

Sir:

Attached is Form PTO/SB/44 suitable for printing.

Submitted herewith is a copy of the Notice of Allowance and Fee(s) Due and the Notice of Allowability dated June 15, 2005 and a copy of the Amendment filed May 23, 2005. Applicants respectfully submit that the corrections shown below are in accordance with the Amendment filed May 23, 2005. The corrections thereof do not involve such changes in the patent as would constitute new matter or would require re-examination. Applicants respectfully request a Certificate of Correction for the following:

In Claim 32, column 8, line 40, between "by" and "oil" insert --an--.

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PATENT
135486

The correction is not due to any error by Applicants and no fee is due.

The Assignment for this patent is recorded on Reel 014500/Frame 0706.

Respectfully submitted,

Date: October 12, 2007

Eric T. Krischke
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Reg. No. 42,769
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OCT 22 2007

**UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION**

PATENT NO. : 6,968,042
APPLICATION NO. : 10/661,844
ISSUE DATE : November 22, 2005
INVENTOR(S) : Toth et al.

PAGE 1 OF 1

It is certified that an error appears or errors appear in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Claim 32, column 8, line 40, between "by" and "oil" insert --an--.

MAILING ADDRESS OF SENDER:

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OCT 22 2007

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THE UNITED STATES PATENT OFFICE IS REQUESTED TO IMPRESS ITS
STAMP ON THIS CARD AND PLACE SAME IN THE OUTGOING MAIL TO
SHOW THE FOLLOWING PAPERS HAVE BEEN RECEIVED.

Atty Dkt. No.: 135486 (12553-373)
Inventors: Thomas Louis Toth et al.
Serial No.: 10/661,844
Filed: September 12, 2003
For: METHODS AND APPARATUS FOR TARGET ANGLE HEEL
EFFECT COMPENSATION

Enclosed:

- Amendment Transmittal which includes Certificate of Express Mail (3 pgs.) NO FEE
- Amendment in response to Office Action dated March 23, 2005 (36 pgs.)
- Return post card

WJZ/lcj

Mailed: May 23, 2005

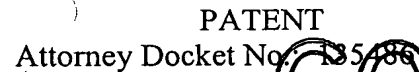
EV593387416US

Express Mail No. EV593387416US

Entered into PAGE/PIPS
Date: 06-04-05
By: lcj

OCT 22 2007





IN THE UNITED STATES PATENT AND TRADEMARK OFFICE


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William Zychlewicz, Reg. No. 51,366

OCT 22 2007

EXTENSION OF TERM

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3. The proceedings herein are for a patent application and the provisions of 37 C.F.R. 1.136 apply.

(complete (a) or (b), as applicable)

- (a) _____ Applicant petitions for an extension of time under 37 C.F.R. 1.136
(Fees: 37 C.F.R. 1.17(a)-(d) for the total number of months checked below:)

Extension for response within:	Other than small entity Fee	Small entity Fee (if applicable)
_____ first month	\$ 120.00	\$ 60.00
_____ second month	\$ 450.00	\$ 225.00
_____ third month	\$ 1,020.00	\$ 510.00
_____ fourth month	\$1,590.00	\$ 795.00
_____ fifth month	\$2,160.00	\$1,080.00

Fee: \$ _____

If an additional extension of time is required, please consider this a petition therefor.

(Check and complete the next item, if applicable)

_____ An extension of _____ months has already been secured. The fee paid therefor \$_____ is deducted from the total fee due for the total months of extension now requested.

Extension fee due with this request \$_____

OR

- (b) X Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition for extension of time.

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FEE FOR CLAIMS

4. The fee for claims (37 C.F.R. 1.16(b)-(d)) has been calculated as shown below:

	(Col. 1) CLAIMS REMAINING AFTER AMENDMENT		(Col. 2) HIGHEST NO. PREVIOUSLY PAID FOR	(Col. 3) PRESENT EXTRA	SMALL ENTITY ADDITIONAL RATE FEE	OR	OTHER THAN SMALL ENTITY ADDITIONAL RATE FEE
		MINUS		=	x \$25.00 = \$		x \$50.00 = \$
TOTAL INDEP.		MINUS		=	x \$100.00 = \$		x \$200.00 = \$
— FIRST PRESENTATION OF MULTIPLE DEP. CLAIM					+ \$180.00 = \$		+ \$360.00 = \$
					TOTAL ADDITIONAL FEE \$	OR	TOTAL ADDITIONAL FEE \$

- (a) ☒ No additional fee for Claims is required

OR

- (b) ☐ Total additional fee for claims required \$ _____

FEE PAYMENT

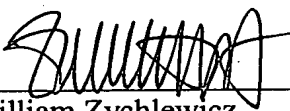
5. Attached is a check in the sum of \$ _____
- ☐ Charge Deposit Account No. 01-2384 the sum of \$ _____.
A duplicate of this transmittal is attached.

FEE DEFICIENCY

6. ☒ If any additional extension and/or fee is required, charge Deposit Account No. 01-2384.

AND/OR

- ☒ If any additional fee for claims is required, charge Deposit Account No. 01-2384.
7. ☐ Other:


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PATENT
135486

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Thomas Louis Toth et al. :
Serial No.: 10/661,844 : Art Unit: 2881
Filed: September 12, 2003 : Examiner: Kidnadze, Irakli
For: METHODS AND APPARATUS :
FOR TARGET ANGLE HEEL :
EFFECT COMPENSATION :

AMENDMENT

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated March 23, 2005, please amend the above
identified application as follows:

OCT 22 2007

IN THE CLAIMS

1. (currently amended) A method of at least partially compensating for an X-ray tube target angle heel effect, said method comprising:

positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect.

2. (original) A method in accordance with Claim 1 wherein said positioning a filter comprises positioning a wedge shaped filter, wherein the wedge shape comprises a horizontal top, a bottom, a first vertical side and a second vertical side, wherein the horizontal top and the bottom are not parallel and wherein the first vertical side and the second vertical side are unequal in length.

3. (original) A method in accordance with Claim 2 wherein said positioning a wedge shaped filter comprises depositing a material on an X-ray tube window to form a wedge shaped filter.

4. (original) A method in accordance with Claim 3 wherein said depositing a material comprises depositing aluminum on an X-ray tube window to form a wedge shaped filter.

5. (original) A method in accordance with Claim 3 wherein said depositing a material comprises depositing copper on an X-ray tube window to form a wedge shaped filter.

6. (original) A method in accordance with Claim 2 wherein said positioning a wedge shaped filter comprises positioning the wedge shaped filter proximate an X-ray tube casing filter separated from an X-ray tube window by an oil gap.

7. (original) A method in accordance with Claim 6 wherein said positioning a wedge shaped filter further comprises positioning an aluminum wedge shaped filter.

8. (original) A method in accordance with Claim 6 wherein said positioning a

wedge shaped filter further comprises positioning a copper wedge shaped filter.

9. (original) A method in accordance with Claim 2 wherein the second vertical side comprises a length between 0.5mm and 1.5mm thicker than the first vertical side.

10. (original) A method in accordance with Claim 9 wherein the second vertical side comprises a length of 1mm greater than the first vertical side.

11. (original) A method in accordance with Claim 1 wherein said positioning a filter comprises positioning a concave-wedge shaped filter, wherein the concave-wedge shape comprises a horizontal top, a concave bottom, a first vertical side and a second vertical side, wherein the first vertical side and the second vertical side are unequal in length.

12. (original) An X-ray tube comprising:

an anode;

a cathode;

a beryllium window; and

a material deposited on said window, wherein said material is wedge shaped, wherein said wedge shape comprises a horizontal top, a bottom, a first vertical side and a second vertical side, wherein said horizontal top and said bottom are not parallel and wherein said first vertical side and said second vertical side are unequal in length.

13. (currently amended) An X-ray tube in accordance with Claim 12 wherein said material deposited on said window forms a wedge shaped filter ~~being positioned~~ ~~includes depositing a material on an X-ray on said X-ray tube window to form said wedge shaped filter.~~

14. (original) An X-ray tube in accordance with Claim 13 wherein said material deposited on an X-ray tube window is aluminum.

15. (original) An X-ray tube in accordance with Claim 13 wherein said material deposited on an X-ray tube window is copper.

16. (currently amended) An imaging system for scanning an object comprising:

a radiation source;

a radiation detector positioned to receive radiation from said radiation source;

a computer operationally coupled to said radiation source and said radiation detector; and

a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect.

17. (original) A system in accordance with Claim 16 wherein said filter is wedge shaped, wherein said wedge shape comprises a horizontal top, a bottom, a first vertical side and a second vertical side, wherein said horizontal top and said bottom are not parallel and wherein said first vertical side and said second vertical side are unequal in length.

18. (original) A system in accordance with Claim 17 wherein said wedge shaped filter being positioned includes depositing a material on an X-ray tube window to form said wedge shaped filter.

19. (original) A system in accordance with Claim 18 wherein said material deposited on an X-ray tube window comprises aluminum.

20. (original) A system in accordance with Claim 18 wherein said material deposited on an X-ray tube window comprises copper.

21. (original) A system in accordance with Claim 17 wherein said wedge shaped filter being positioned includes positioning said wedge shaped filter proximate an X-ray tube casing filter separated from an X-ray tube window by an oil gap.

22. (original) A system in accordance with Claim 21 wherein said wedge shaped filter being positioned comprises aluminum.

23. (original) A system in accordance with Claim 21 wherein said wedge shaped filter being positioned comprises copper.

24. (original) A system in accordance with Claim 17 wherein said second vertical side comprises a length between 0.5mm and 1.5mm thicker than said first vertical side.

25. (original) A system in accordance with Claim 24 wherein said second vertical side comprises a length of 1mm greater than said first vertical side.

26. (original) A system in accordance with Claim 16 wherein said filter is concave-wedge shaped, wherein said concave-wedge shape comprises a horizontal top, a concave bottom, a first vertical side and a second vertical side, wherein said first vertical side and said second vertical side are unequal in length.

27. (currently amended) A Computed Tomography (CT) imaging system for scanning an object comprising:

an X-ray source;

an X-ray detector positioned to receive X-rays from said source;

a computer operationally coupled to said X-ray source and said X-ray detector; and

a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect.

28. (original) A system in accordance with Claim 27 wherein said filter is wedge shaped, wherein said wedge shape comprises a horizontal top, a bottom, a first vertical side and a second vertical side, wherein said horizontal top and said bottom are not parallel and wherein said first vertical side and said second vertical side are unequal in length.

29. (original) A system in accordance with Claim 28 wherein said wedge shaped filter being positioned includes depositing a material on an X-ray tube window to

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form said wedge shaped filter.

30. (original) A system in accordance with Claim 29 wherein said material deposited on an X-ray tube window is aluminum.

31. (original) A system in accordance with Claim 29 wherein said material deposited on an X-ray tube window is copper.

32. (original) A system in accordance with Claim 28 wherein said wedge shaped filter being positioned includes positioning said wedge shaped filter proximate an X-ray tube casing filter separated from an X-ray tube window by an oil gap.

33. (original) A system in accordance with Claim 32 wherein said wedge shaped filter being positioned is aluminum.

34. (original) A system in accordance with Claim 32 wherein said wedge shaped filter being positioned is copper.

35. (original) A system in accordance with Claim 28 wherein said second vertical side comprises a length between 0.5mm and 1.5mm thicker than said first vertical side.

36. (original) A system in accordance with Claim 28 wherein said second vertical side comprises a length of 1mm greater than said first vertical side.

37. (original) A system in accordance with Claim 27 wherein said filter is concave-wedge shaped, wherein said concave-wedge shape comprises a horizontal top, a concave bottom, a first vertical side and a second vertical side, wherein said first vertical side and said second vertical side are unequal in length.

Remarks

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The Office Action dated March 23, 2005 has been carefully reviewed and the foregoing amendment has been made in consequence thereof.

Claims 1-37 are now pending in this application. Claims 1-37 stand rejected.

The objection to Claim 13 due to informalities is respectfully traversed. Specifically, Claim 13 has been amended to recite "wherein said material deposited on said window forms a wedge shaped filter on said X-ray tube window." It is submitted that this amendment corrects an antecedent basis and does not affect the scope of the claims. Applicants therefore request that the objection to Claim 13 be withdrawn.

The rejection of Claims 1 and 2 under 35 U.S.C. 102(b) as being anticipated by Grossman (U.S. Patent No. 2,225,940) is respectfully traversed.

Grossman describes an X-ray tube (2) including a generally cone-shaped diaphragm box (6). A movable filter (12) is illustrated as being wedge shaped in longitudinal cross-section and extending transversely to said X-ray beam. Disk (62) is a filter material mounted for rotation to bring different parts of its marginal portion into the path of the X-ray beam wherein the marginal portion varies in thickness circumferentially of the disk. A wedge shaped filter (86) may be similar to movable filter (12). An adjustable filter (96) includes a lead part (98), a stepped copper part (100), and a wedge-shaped aluminum part (102). Notably, each of filters (12), (62), (86), and (96) are illustrated in Figures 1, 2, 3, and 4, respectively, and described as being of thicker material toward the (82) (shown in Figure 3 and un-numbered in figures 1, 2, and 4). An additional, fixed, web-shaped filter (88) includes a thickness that diminishes longitudinally in the same or approximately the same ratio in the direction that filter (86) increases per unit of length. The sum of filters (86) and (88) is constant throughout the field for each adjustment of movable filter (86). A fixed wedge-shaped aluminum filter (116) is provided to counteract the local unequal filtering of the rays when wedge-shaped section (102) is used. Notably, filters (88) and (116) are used cooperatively with another wedge-shaped filter to correct the field or to counteract local unequal filtering. None of the filters described in Grossman are configured to compensate for the target angle heel effect.

Claim 1 recites a method of at least partially compensating for an X-ray tube target angle heel effect wherein the method includes positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect.

Grossman does not describe nor suggest a method as is described in Claim 1. Specifically, Grossman does not describe nor suggest positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side. Rather, in contrast to the present invention, Grossman describes wedge-shaped filters that have a higher attenuation on the anode side than the cathode side, and additional wedge shaped filters that cooperate with the above filters to correct the field or to counteract local unequal filtering, but Grossman does not describe nor suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side. Accordingly, for at least the reasons set forth above, Applicants respectfully submit that Claim 1 is patentable over Grossman.

Claim 2 depends from independent Claim 1. When the recitations of Claim 2 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 2 likewise is patentable over Grossman.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1 and 2 be withdrawn.

The rejection of Claims 1, 2, 9, and 10 under 35 U.S.C. 102(b) as being anticipated by Minami (U.S. Patent No. 4,101,766) is respectfully traversed.

Minami describes an X-ray photographing apparatus (10) wherein X-rays are emitted from an X-ray source (12) and are irradiated on a subject (14) to make an X-ray image of subject (14) after passing therethrough. X-ray source (12) includes an X-ray tube (28), a cathode (29), and an anode target (30). Because the electron-impact surface of the anode target (30) is inclined relative to the axis of the X-ray tube (28), the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface thereof. Generally, X-rays have an intensity inversely proportional to a distance through which they travel such

that, X-rays passing through the peripheral portion of the radiating window (31) travel for a longer distance than those conducted through the central portion of the radiating window (31) and in consequence decrease in intensity on the projection plane than the X-rays which are emitted through the central portion. Notably, Minami does not describe target angle heel effect wherein X-rays generated within the target travel different distances within the target and are accordingly attenuated differently such that X-rays emitted toward a cathode side travel a shorter distance within the target than X-rays emitted toward the anode side wherein the difference in attenuation is the heel effect. Rather, in contrast to the present invention, Minami describes the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target.

Claim 1 recites a method of at least partially compensating for an X-ray tube target angle heel effect wherein the method includes positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect.

Minami does not describe nor suggest a method as is described in Claim 1. Specifically, Minami does not describe nor suggest positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. Rather, in contrast to the present invention, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source, but Minami does not describe nor suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. Accordingly, for at least the reasons set forth above, Applicants respectfully submit that Claim 1 is patentable over Minami.

Claims 2, 9, and 10 depend from independent Claim 1. When the recitations of Claims 2, 9, and 10 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 2, 9, and 10 likewise are patentable over Minami.

For at least the reasons set forth above, Applicants respectfully request that the Section 102 rejection of Claims 1, 2, 9, and 10 be withdrawn.

The rejection of Claims 3-5 under 35 U.S.C. § 103(a) as being unpatentable over Minami (U.S. Patent No. 4,101,766) in view of Albagli (U.S. Patent 6,418,193) is respectfully traversed.

Minami is described above. Albagli describes a spectral filter made of a high-Z material in a prescribed range of thickness can effectively filter out X-rays in spectral ranges determined to be poor contributors to a high-quality image. The use of such a spectral filter results in improvement in the contrast-to-noise ratio (CNR) and an increase in the signal level (CF), for a given unit of exposure to radiation.

Applicants respectfully submit that the Section 103 rejection of the presently pending claims is not a proper rejection. Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Minami according to the teachings of Albagli. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, "to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant." In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, "it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 147 USPQ 391, 393 (CCPA 1965). Rather, there must be some suggestion, outside of

Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the cited art, nor any reasonable expectation of success has been shown.

Although Applicants agree with the assessment in the Office Action that Minami does not describe depositing a material, such as copper or aluminum on an X-ray tube window to form a wedge shaped filter, and that Albagli describe placing a filter in proximity to the exit port of the X-ray tube in a range between about 0 inches to 8 inches, Applicants respectfully disagree with the assertion that Albagli describes depositing a material, such as copper or aluminum on an X-ray tube window. Applicants respectfully submit that placing a filter in proximity to the exit port of the X-ray tube in a range between 0 inches to 8 inches can not fairly be equated with depositing a material, such as copper or aluminum on an X-ray tube window. As is known in the art, placing a filter in proximity to the exit port of the X-ray tube is not interchangeable with depositing a material, such as copper or aluminum on an X-ray tube window. As such, the combination of Minami and Albagli collectively fails to teach each of the elements of the claimed invention. For at least the reasons set forth above, Claims 3-5 are submitted to be patentable over Minami in view of Albagli.

Moreover, Applicants submit that there is no teaching nor suggestion in the cited art for the claimed combination, and as such, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Specifically, Minami is cited for its teaching of the claimed invention except for depositing a material on an X-ray tube window to form a wedge shaped filter, and Albagli is cited for its alleged teaching of depositing a material on an X-ray tube window to form a wedge shaped filter. Of course, such a combination, based on hindsight reconstruction, is impermissible, and for this reason alone, Applicants request that the Section 103 rejection of Claims 3-5 be withdrawn.

Furthermore, Applicants respectfully submit that no motivation for the combination can be found within Minami and Albagli, as Minami and Albagli teach away from each other. Specifically, Minami describe the thickness of the filter means is determined in consideration of the distribution of the intensity of X-rays emitted from the X-ray source and the

distribution of brightness of each of light images from the X-ray image intensifier and from an optical lens system, and in contrast, Albagli describe a spectral filter that filters out X-rays in spectral ranges determined to be poor contributors to a high-quality image wherein the use of such a spectral filter results in improvement in the contrast-to-noise ratio (CNR) and an increase in the signal level (CF), for a given unit of exposure to radiation. Accordingly, Minami describes attenuating the intensity of a beam of X-rays and Albagli describes filtering out only X-rays of a predetermined energy.

If art “teaches away” from a claimed invention, such a teaching supports the nonobviousness of the invention. U.S. v. Adams, 148 USPQ 479 (1966); Gillette Co. v. S.C. Johnson & Son, Inc., 16 USPQ2d 1923, 1927 (Fed. Cir. 1990). In light of this standard, it is respectfully submitted that the cited art, as a whole, is not suggestive of the presently claimed invention. More specifically, Applicants respectfully submit that Minami teaches away from Albagli, and as such, there is no suggestion or motivation to combine Minami with Albagli.

Moreover, no combination of Minami and Albagli, describes or suggests the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 recites a method of at least partially compensating for an X-ray tube target angle heel effect wherein the method includes “positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect.”

Neither Minami nor Albagli, considered alone or in combination, describe or suggest positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. Rather, in contrast to the present invention, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source, and Albagli describes a spectral filter that filters out X-rays in spectral ranges determined to be poor contributors to a high-quality image wherein the use of such a spectral filter results in improvement in the contrast-to-noise ratio (CNR) and an increase in the signal level (CF), for a given unit of exposure to radiation, but neither Minami nor

Albagli, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 1 is submitted to be patentable over Minami in view of Albagli.

Claims 3-5 depend from independent Claim 1. When the recitations of Claims 3-5 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 3-5 likewise are patentable over Minami in view of Albagli.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 3-5 be withdrawn.

The rejection of Claims 6-8 under 35 U.S.C. § 103(a) as being unpatentable over Minami (U.S. Patent No. 4,101,766) in view of Koller (U.S. Patent 4,107,562) is respectfully traversed.

Minami is described above. Koller describes an X-ray generator 20 comprising a hollow cylindrical housing 22, a longitudinally disposed X-ray tube 26 surrounded by a dielectric coolant fluid 32. Cylindrical housing 22 includes an arcuate wall 56 which is substantially of uniform thickness and symmetrically disposed with respect to the focal spot area 48 wherein the thickness of arcuate wall 56 is determined by the transmission of X-rays above a preferred frequency. As such wall 56 is provided with sufficient thickness to permit "hard" X-rays to pass through it, while absorbing any "soft" X-rays in beam 50. Accordingly, wall 56 functions as a filter to permit the passage of X-rays having respective energies above a predetermined level.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Minami nor Koller, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Minami with Koller, because there is no motivation to combine the references suggested in the art. Additionally,

the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one with ordinary skill in the art at the time the invention was made to employ the X-ray tube teachings of Koller in the invention of Minami because it would provide the wedge filter to the close proximity to the X-ray exit window" suggests combining the disclosures.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is clearly based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention.

Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Minami according to the teachings of Koller. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, "to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant." In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, "it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 147 USPQ 391, 393 (CCPA 1965).

Although Applicants agree with the assessment in the Office Action that Minami does not describe depositing a material, such as copper or aluminum on an X-ray tube window to form a wedge shaped filter, Applicants respectfully disagree with the assertion that Koller describes that the wedge shaped filter is separated from an X-ray tube window by an oil gap. The Office Action asserts that Koller describes "filter (56) is separated from an X-ray tube window (34) by an oil gap (32)." Office Action page 5, line 9. However, reference numeral 34 is described as an "evacuated tubular envelope 34" Koller, Column 3, lines 14-15. Applicants respectfully submit that the present specification describes that the X-ray tube is mounted within a casing wherein the X-ray tube and the casing both have an X-ray transmissive window and Claim 1 recites in part, "an X-ray tube casing filter separated from an X-ray tube window by an oil gap. Accordingly, the present specification describes that the X-ray tube and the casing are separate items and that each includes a window that is separated by an oil gap, and Koller describes an X-ray tube with no window and a casing filter that are separated by a dielectric fluid. As such, the combination of Minami and Koller collectively fails to teach each of the elements of the claimed invention. For at least the reasons set forth above, Claims 6-8 are submitted to be patentable over Minami in view of Koller.

Moreover, Applicants submit that there is no teaching nor suggestion in the cited art for the claimed combination, and as such, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an

attempt to deprecate the present invention. Specifically, Minami is cited for its teaching of the wedge-shaped filter positioned proximate to the X-ray tube separated by a gap, and Koller is cited for its teaching of a filter separated from an X-ray tube window by an oil gap. Of course, such a combination, based on hindsight reconstruction, is impermissible, and for this reason alone, Applicants request that the Section 103 rejection of Claims 6-8 be withdrawn.

Moreover, no combination of Minami and Koller, describes or suggests the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 recites a method of at least partially compensating for an X-ray tube target angle heel effect wherein the method includes "positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect."

Neither Minami nor Koller, considered alone or in combination, describe or suggest positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. Rather, in contrast to the present invention, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source, and Koller describes an "evacuated tubular envelope 34" separated from a filter by a gap filled with dielectric fluid, but neither Minami nor Koller, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 1 is submitted to be patentable over Minami in view of Koller.

Claims 6-8 depend from independent Claim 1. When the recitations of Claims 6-8 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claims 6-8 likewise are patentable over Minami in view of Koller.

For at least the reasons set forth above, Applicants respectfully request that the

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Section 103 rejection of Claims 6-8 be withdrawn.

The rejection of Claim 11 under 35 U.S.C. § 103(a) as being unpatentable over Minami (U.S. Patent No. 4,101,766) in view of Moore (U.S. Patent 4,181,858) is respectfully traversed.

Minami is described above. Moore describes adjustable wedge-shaped attenuating bodies, which can be automatically adjusted to suit different sizes of patient so that those used give the best correction for the patient being examined and minimize the discontinuity in absorption which can occur at the edge of the attenuating body if incorrectly sized attenuators are adjusted. Each wedge 26 is relatively large at one end and then of decreasing thickness with length and has a relatively thin part 26 of sufficient length to extend across the entire fan of radiation.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Minami nor Moore, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Minami with Moore, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one with ordinary skill in the art at the time the invention was made to employ the teachings of Moore in the system of Minami to provide the concave wedge shaped filter arrangement because it would allow to correct the intensity distributions of X-rays allowing to at least partially remove certain effects of the physical characteristics of the X-ray tube" suggests combining the disclosures. However, Moore describes that the wedges are used to suit different sizes of patient so that the best correction for the patient being examined is used and to minimize the discontinuity in absorption which can occur at the edge of the attenuating body if incorrectly sized attenuators are used, but Moore does not describe nor suggest that the wedge allows correcting the intensity distributions of X-rays to at least partially remove certain effects of the physical characteristics of the X-ray tube.

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As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is clearly based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention.

Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Minami according to the teachings of Moore. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, "to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant." In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, “it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” In re Wesslau, 147 USPQ 391, 393 (CCPA 1965).

Moreover, Applicants submit that there is no teaching nor suggestion in the cited art for the claimed combination, and as such, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Specifically, Minami is cited for its teaching of the wedge-shaped filter, and Moore is cited for its teaching of positioning a concave wedge shaped between an x-ray source and an x-ray detector for correcting distributions of x-rays. Of course, such a combination, based on hindsight reconstruction, is impermissible, and for this reason alone, Applicants request that the Section 103 rejection of Claim 11 be withdrawn.

Moreover, no combination of Minami and Moore, describes or suggests the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 1 recites a method of at least partially compensating for an X-ray tube target angle heel effect wherein the method includes “positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect.”

Neither Minami nor Moore, considered alone or in combination, describe or suggest positioning a filter having an anode side and a cathode side between an X-ray source and an X-ray detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. Rather, in contrast to the present invention, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source, and Moore describes wedges that are used to suit different sizes of patient so that the best correction for the patient being examined is used and to minimize the discontinuity in absorption which can occur at the edge of the attenuating body if incorrectly

sized attenuators are used, but neither Minami nor Moore, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 1 is submitted to be patentable over Minami in view of Moore.

Claim 11 depends from independent Claim 1. When the recitations of Claim 11 are considered in combination with the recitations of Claim 1, Applicants submit that dependent Claim 11 likewise are patentable over Minami in view of Moore.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claim 11 be withdrawn.

The rejection of Claims 3-5 under 35 U.S.C. § 103(a) as being unpatentable over Grossman (U.S. Patent No. 2,225,940) in view of Albagli (U.S. Patent 6,418,193) is respectfully traversed.

Grossman and Albagli are described above.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Grossman nor Albagli, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Grossman with Albagli, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one with ordinary skill in the art at the time the invention was made to use beryllium as an excellent X-ray transmissive material for the window of the X-ray tube" suggests combining the disclosures.

More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, "to establish obviousness

based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.” In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, “it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” In re Wesslau, 147 USPQ 391, 393 (CCPA 1965). Rather, there must be some suggestion, outside of Applicants’ disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicants’ disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion nor motivation to combine the cited art, nor any reasonable expectation of success has been shown.

Although Applicants agree with the assessment in the Office Action that Grossman does not describe depositing a material, such as copper or aluminum on an X-ray tube window to form a wedge shaped filter, and that Albagli describe placing a filter in proximity to the exit port of the X-ray tube in a range between about 0 inches to 8 inches, Applicants respectfully disagree with the assertion that Albagli describes depositing a material, such as copper or aluminum on an X-ray tube window. Applicants respectfully submit that placing a filter in proximity to the exit port of the X-ray tube in a range between 0 inches to 8 inches can not fairly be equated with depositing a material, such as copper or aluminum on an X-ray tube window. As is known in the art, placing a filter in proximity to the exit port of the X-ray tube is not interchangeable with depositing a material, such as copper or aluminum on an X-ray tube window. As such, the combination of Grossman and Albagli collectively fails to

teach each of the elements of the claimed invention. For at least the reasons set forth above, Claims 12-15 are submitted to be patentable over Grossman in view of Albagli.

Moreover, Applicants submit that there is no teaching nor suggestion in the cited art for the claimed combination, and as such, the Section 103 rejection appears to be based on a hindsight reconstruction in which isolated disclosures have been picked and chosen in an attempt to deprecate the present invention. Specifically, Grossman is cited for its teaching of the claimed invention except for depositing a material on an X-ray tube window to form a wedge shaped filter, and Albagli is cited for its teaching of depositing a material on an X-ray tube window to form a wedge shaped filter. Of course, such a combination, based on hindsight reconstruction, is impermissible, and for this reason alone, Applicants request that the Section 103 rejection of Claims 12-15 be withdrawn.

Furthermore, no combination of Grossman and Albagli, describes or suggests the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 12 recites an X-ray tube including "an anode...a cathode...a beryllium window...a material deposited on said window, wherein said material is wedge shaped, wherein said wedge shape comprises a horizontal top, a bottom, a first vertical side and a second vertical side, wherein said horizontal top and said bottom are not parallel and wherein said first vertical side and said second vertical side are unequal in length."

Neither Grossman nor Albagli, considered alone or in combination, describe or suggest a material deposited on a beryllium window, wherein said material is wedge shaped. Rather, in contrast to the present invention, Grossman describes wedge-shaped filters that have a higher attenuation on the anode side than the cathode side, and additional wedge shaped filters that cooperate with the above filters to correct the field or to counteract local unequal filtering, and Albagli describes a spectral filter made of a high-Z material in a prescribed range of thickness can effectively filter out X-rays in spectral ranges determined to be poor contributors to a high-quality image, but neither Grossman nor Albagli, considered alone or in combination, describe or suggest a wedge shaped a material deposited on a beryllium window. For at least the reasons set forth above, Claim 12 is submitted to be patentable over Grossman in view of Albagli.

Claims 13-15 depend from independent Claim 12. When the recitations of Claims 13-15 are considered in combination with the recitations of Claim 12, Applicants submit that dependent Claims 13-15 likewise are patentable over Grossman in view of Albagli.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 12-15 be withdrawn.

The rejection of Claims 16, 17, 21-25, 27, 28, and 32-36 under 35 U.S.C. § 103(a) as being unpatentable over Koller (U.S. Patent 4,107,562) in view of Minami (U.S. Patent No. 4,101,766) is respectfully traversed.

Koller and Minami are described above.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. Neither Koller nor Minami, considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Koller with Minami, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one with ordinary skill in the art at the time the invention was made to employ teachings of Minami in the system of Koller because it would allow to provide the X-ray source with the wedge shaped filter arrangement allowing to at least partially remove certain effects of the physical characteristics of the x-ray tube such as a target angle heel effect" suggests combining the disclosures.

Although Applicants agree with the assessment in the Office Action that Koller does not describe a filter wherein a cathode side of the filter has a higher attenuation coefficient than the anode side, to at least partially compensate for a target angle heel effect, Applicants respectfully disagree with the assertion that Minami describes correcting the distributions of x-rays to at least partially compensate for an X-ray tube target angle heel effect. Rather, in contrast to the present invention Minami describes the intensity of X-rays is distributed such

that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target and that the wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source, but Minami does not describe nor suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. As such, the combination of Koller and Minami collectively fails to teach each of the elements of the claimed invention. For at least the reasons set forth above, Claims 6-8 are submitted to be patentable over Koller in view of Minami.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levensgood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is clearly based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention.

Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Koller according to the teachings of Minami. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, "to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some

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motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.” In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, “it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art.” In re Wesslau, 147 USPQ 391, 393 (CCPA 1965).

Moreover, no combination of Koller and Minami, describes or suggests the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 16 recites an imaging system for scanning an object including “a radiation source...a radiation detector positioned to receive radiation from said radiation source...a computer operationally coupled to said radiation source and said radiation detector...a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect.”

Neither Koller nor Minami, considered alone or in combination, describe or suggest an imaging system including a filter having an anode side and a cathode side, positioned between the source and the detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect. Rather, in contrast to the present invention, Koller describes an X-ray generator including a hollow cylindrical housing, a longitudinally disposed X-ray tube surrounded by a dielectric coolant fluid, and Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-

rays emitted from the X-ray source wherein the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target, but neither Koller nor Minami, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 16 is submitted to be patentable over Koller in view of Minami.

Claims 17, and 21-25 depend from independent Claim 16. When the recitations of Claims 17, and 21-25 are considered in combination with the recitations of Claim 16, Applicants submit that dependent Claims 17, and 21-25 likewise are patentable over Koller in view of Minami.

Claim 27 recites a Computed Tomography (CT) imaging system for scanning an object including "an X-ray source...an X-ray detector positioned to receive X-rays from said source...a computer operationally coupled to said X-ray source and said X-ray detector...a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect."

Neither Koller nor Minami, considered alone or in combination, describe or suggest a CT imaging system including a filter having an anode side and a cathode side, positioned between the source and the detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect. Rather, in contrast to the present invention, Koller describes an X-ray generator including a hollow cylindrical housing, a longitudinally disposed X-ray tube surrounded by a dielectric coolant fluid, and Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source wherein the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target, but neither Koller nor Minami, considered alone or in combination, describe or suggest a wedge shaped filter

wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 27 is submitted to be patentable over Koller in view of Minami.

Claims 28, and 32-36 depend from independent Claim 27. When the recitations of Claims 28, and 32-36 are considered in combination with the recitations of Claim 27, Applicants submit that dependent Claims 28, and 32-36 likewise are patentable over Koller in view of Minami.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 16, 17, 21-25, 27, 28, and 32-36 be withdrawn.

The rejection of Claims 18-20 and 29-31 under 35 U.S.C. § 103(a) as being unpatentable over Koller (U.S. Patent 4,107,562) in view of Minami (U.S. Patent No. 4,101,766) and further in view of Albagli (U.S. Patent 6,418,193) is respectfully traversed.

Koller, Minami, and Albagli are described above.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Koller, Minami, nor Albagli considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Koller with Minami, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one with ordinary skill in the art at the time the invention was made to depositing the filter directly to the x-ray exit window because it would substantially intercept almost all x-rays exiting the window" suggests combining the disclosures.

Although Applicants agree with the assessment in the Office Action that Koller in

view of Minami does not describe depositing a material, such as copper or aluminum on an X-ray tube window to form a wedge shaped filter, and that Albagli describe placing a filter in proximity to the exit port of the X-ray tube in a range between about 0 inches to 8 inches, Applicants respectfully disagree with the assertion that Albagli describes depositing a material, such as copper or aluminum on an X-ray tube window. Applicants respectfully submit that placing a filter in proximity to the exit port of the X-ray tube in a range between 0 inches to 8 inches can not fairly be equated with depositing a material, such as copper or aluminum on an X-ray tube window. As is known in the art, placing a filter in proximity to the exit port of the X-ray tube is not interchangeable with depositing a material, such as copper or aluminum on an X-ray tube window. As such, the combination of Koller, Minami, and Albagli collectively fails to teach each of the elements of the claimed invention. For at least the reasons set forth above, Claims 18-20 and 29-31 are submitted to be patentable over Minami in view of Albagli.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures, nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is clearly based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention.

Obviousness cannot be established by merely suggesting that it would have been an

obvious to one of ordinary skill in the art to modify Koller according to the teachings of Minami and Albagli. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, "to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant." In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention."

In re Fitch, 23 USPQ2d 1780, 1784 (Fed. Cir. 1992). Further, under Section 103, "it is impermissible . . . to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." In re Wesslau, 147 USPQ 391, 393 (CCPA 1965).

Moreover, no combination of Koller Minami and Albagli, describes or suggests the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 16 recites an imaging system for scanning an object including "a radiation source...a radiation detector positioned to receive radiation from said radiation source...a computer operationally coupled to said radiation source and said radiation detector...a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect."

None of Koller, Minami, nor Albagli considered alone or in combination, describe or suggest an imaging system including a filter having an anode side and a cathode side, positioned between the source and the detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is

determined to at least partially compensate for a target angle heel effect. Rather, in contrast to the present invention, Koller describes an X-ray generator including a hollow cylindrical housing, a longitudinally disposed X-ray tube surrounded by a dielectric coolant fluid, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source wherein the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target, and Albagli describes a spectral filter that filters out X-rays in spectral ranges determined to be poor contributors to a high-quality image wherein the use of such a spectral filter results in improvement in the contrast-to-noise ratio (CNR) and an increase in the signal level (CF), for a given unit of exposure to radiation, but none of Koller, Minami, nor Albagli, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 16 is submitted to be patentable over Koller in view of Minami and further in view of Albagli.

Claims 18-20 depend from independent Claim 16. When the recitations of Claims 18-20 are considered in combination with the recitations of Claim 16, Applicants submit that dependent Claims 18-20 likewise are patentable over Koller in view of Minami and further in view of Albagli.

Claim 27 recites a Computed Tomography (CT) imaging system for scanning an object including "an X-ray source...an X-ray detector positioned to receive X-rays from said source...a computer operationally coupled to said X-ray source and said X-ray detector...a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect."

None of Koller, Minami, nor Albagli, considered alone or in combination, describe or suggest a CT imaging system including a filter having an anode side and a cathode side, positioned between the source and the detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is

determined to at least partially compensate for a target angle heel effect. Rather, in contrast to the present invention, Koller describes an X-ray generator including a hollow cylindrical housing, a longitudinally disposed X-ray tube surrounded by a dielectric coolant fluid, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source wherein the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target, and Albagli describes a spectral filter that filters out X-rays in spectral ranges determined to be poor contributors to a high-quality image wherein the use of such a spectral filter results in improvement in the contrast-to-noise ratio (CNR) and an increase in the signal level (CF), for a given unit of exposure to radiation, but none of Koller, Minami, nor Albagli, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 27 is submitted to be patentable over Koller in view of Minami and further in view of Albagli.

Claims 29-31 depend from independent Claim 27. When the recitations of Claims 29-31 are considered in combination with the recitations of Claim 27, Applicants submit that dependent Claims 29-31 likewise are patentable over Koller in view of Minami and further in view of Albagli.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 18-20 and 29-31 be withdrawn.

The rejection of Claims 26 and 37 under 35 U.S.C. § 103(a) as being unpatentable over Koller (U.S. Patent 4,107,562) in view of Minami (U.S. Patent No. 4,101,766) and further in view of Moore (U.S. Patent 4,181,858) is respectfully traversed.

Koller, Minami, and Moore are described above.

Applicant respectfully submits that the Section 103 rejection of the presently pending claims is not a proper rejection. As is well established, obviousness cannot be established by combining the teachings of the cited art to produce the claimed invention, absent some teaching, suggestion, or incentive supporting the combination. None of Koller, Minami, nor

Moore considered alone or in combination, describe or suggest the claimed combination. Furthermore, in contrast to the assertion within the Office Action, Applicant respectfully submits that it would not be obvious to one skilled in the art to combine Koller with Minami, because there is no motivation to combine the references suggested in the art. Additionally, the Examiner has not pointed to any prior art that teaches or suggests to combine the disclosures, other than Applicant's own teaching. Rather, only the conclusory statement that "[i]t would have been obvious to one with ordinary skill in the art at the time the invention was made to employ the teachings of Moore to provide the concave wedge shaped filter arrangement in the system of Koller in view of Minami because it would allow to at least partially compensate for asymmetric intensity distribution of x-rays while partially removing certain effects of the physical characteristics of the x-ray tube" suggests combining the disclosures. However, Moore describes that the wedges are used to suit different sizes of patient so that the best correction for the patient being examined is used and to minimize the discontinuity in absorption which can occur at the edge of the attenuating body if incorrectly sized attenuators are used, but Moore does not describe nor suggest that the wedge allows correcting the intensity distributions of X-rays to at least partially remove certain effects of the physical characteristics of the X-ray tube.

Although Applicants agree with the assessment in the Office Action that Koller in view of Minami does not describe a concave wedge shaped filter, Applicants respectfully disagree with the assertion that Moore describes a concave wedge shaped filter having an attenuation coefficient that is determined to at least partially compensate for a target angle heel effect. As such, the combination of Koller, Minami, and Moore collectively fails to teach each of the elements of the claimed invention. For at least the reasons set forth above, Claims 26 and 27 are submitted to be patentable over Minami in view of Moore.

As the Federal Circuit has recognized, obviousness is not established merely by combining references having different individual elements of pending claims. Ex parte Levengood, 28 U.S.P.Q.2d 1300 (Bd. Pat. App. & Inter. 1993). MPEP 2143.01. Rather, there must be some suggestion, outside of Applicants' disclosure, in the prior art to combine such references, and a reasonable expectation of success must be both found in the prior art, and not based on Applicant's disclosure. In re Vaeck, 20 U.S.P.Q.2d 1436 (Fed. Cir. 1991). In the present case, neither a suggestion or motivation to combine the prior art disclosures,

nor any reasonable expectation of success has been shown.

Furthermore, it is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the cited art so that the claimed invention is rendered obvious. Specifically, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the art to deprecate the claimed invention. Further, it is impermissible to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. The present Section 103 rejection is clearly based on a combination of teachings selected from multiple patents in an attempt to arrive at the claimed invention.

Obviousness cannot be established by merely suggesting that it would have been an obvious to one of ordinary skill in the art to modify Koller according to the teachings of Minami and Moore. More specifically, it is respectfully submitted that a prima facie case of obviousness has not been established. As explained by the Federal Circuit, “to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant.” In re Kotzab, 54 USPQ2d 1308, 1316 (Fed. Cir. 2000). MPEP 2143.01.

Moreover, the Federal Circuit has determined that:

[I]t is impermissible to use the claimed invention as an instruction manual or “template” to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that “[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.”

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Moreover, no combination of Koller Minami and Moore, describes or suggests

the claimed combination, and as such, the presently pending claims are patentably distinguishable from the cited combination. Specifically, Claim 16 recites an imaging system for scanning an object including "a radiation source...a radiation detector positioned to receive radiation from said radiation source...a computer operationally coupled to said radiation source and said radiation detector...a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect."

None of Koller, Minami, nor Moore considered alone or in combination, describe or suggest an imaging system including a filter having an anode side and a cathode side, positioned between the source and the detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect. Rather, in contrast to the present invention, Koller describes an X-ray generator including a hollow cylindrical housing, a longitudinally disposed X-ray tube surrounded by a dielectric coolant fluid, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source wherein the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target, and Moore describes wedges that are used to suit different sizes of patient so that the best correction for the patient being examined is used and to minimize the discontinuity in absorption which can occur at the edge of the attenuating body if incorrectly sized attenuators are used, but none of Koller, Minami, nor Moore, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 16 is submitted to be patentable over Koller in view of Minami and further in view of Moore.

Claim 26 depends from independent Claim 16. When the recitations of Claim 26 are considered in combination with the recitations of Claim 16, Applicants submit that dependent Claim 26 likewise is patentable over Koller in view of Minami and further in view of Moore.

Claim 27 recites a Computed Tomography (CT) imaging system for scanning an

object including "an X-ray source...an X-ray detector positioned to receive X-rays from said source...a computer operationally coupled to said X-ray source and said X-ray detector...a filter having an anode side and a cathode side, positioned between said source and said detector, wherein said cathode side has a higher attenuation coefficient than said anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect."

None of Koller, Minami, nor Moore, considered alone or in combination, describe or suggest a CT imaging system including a filter having an anode side and a cathode side, positioned between the source and the detector, wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for a target angle heel effect. Rather, in contrast to the present invention, Koller describes an X-ray generator including a hollow cylindrical housing, a longitudinally disposed X-ray tube surrounded by a dielectric coolant fluid, Minami describes a wedge-like filter that is effective to unify the distribution of the intensity of X-rays emitted from the X-ray source wherein the intensity of X-rays is distributed such that it is maximum in the direction perpendicular to the surface of the anode target and minimum or zero in the direction tangential to the surface of the anode target, and Moore describes wedges that are used to suit different sizes of patient so that the best correction for the patient being examined is used and to minimize the discontinuity in absorption which can occur at the edge of the attenuating body if incorrectly sized attenuators are used, but none of Koller, Minami, nor Moore, considered alone or in combination, describe or suggest a wedge shaped filter wherein the cathode side has a higher attenuation coefficient than the anode side, and wherein the attenuation coefficient is determined to at least partially compensate for the target angle heel effect. For at least the reasons set forth above, Claim 27 is submitted to be patentable over Koller in view of Minami and further in view of Moore.

Claim 37 depends from independent Claim 27. When the recitations of Claim 37 are considered in combination with the recitations of Claim 27, Applicants submit that dependent Claim 37 likewise are patentable over Koller in view of Minami and further in view of Moore.

For at least the reasons set forth above, Applicants respectfully request that the Section 103 rejection of Claims 26 and 37 be withdrawn.

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In view of the foregoing amendments and remarks, all the claims now active in this application are believed to be in condition for allowance. Reconsideration and favorable action is respectfully solicited.

Respectfully submitted,



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